PROCEEDINGS
OF THE
ELEVENTH ANNUAL ACQUISITION RESEARCH SYMPOSIUM

WEDNESDAY SESSIONS
VOLUME I

"Pushing a Big Rock Up a Steep Hill": Acquisition Lessons Learned From DoD Applications Storefront

Amanda George, SPAWAR Systems Center
Pacific Michael Morris, SPAWAR Systems Center
Pacific Matthew O'Neil, SPAWAR Systems Center
Pacific

Published April 30, 2014

Report Documentation Page		

1. REPORT DATE **30 APR 2014**	2. REPORT TYPE	3. DATES COVERED **00-00-2014 to 00-00-2014**
4. TITLE AND SUBTITLE **'Pushing a Big Rock Up a Steep Hill': Acquisition Lessons Learned From DoD Applications Storefront**		5a. CONTRACT NUMBER
		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)		5d. PROJECT NUMBER
		5e. TASK NUMBER
		5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **SPAWAR Systems Center Pacific ,53560 Hull Street,San Diego,CA,92152-5001**		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT **Approved for public release; distribution unlimited**

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The DoD and the military services are currently working to provide widget and app storefronts to disseminate applications that enable agile, composable, C2 capabilities. Leveraging the government-developed open source Ozone Widget Framework, web applications can be registered in a single repository, and discovered and composed by the warfighter. Through both process and technical means, the DoD Applications Store works to streamline the software acquisitions process. The DoD Applications Store as an Ozone Marketplace will include automated delivery of software patches, web applications, widgets, and mobile application packages. The envisioned application store will deliver software from a central repository, over the land or air, to the warfighter at the tactical edge, thereby increasing C2 agility. Through the last several years SPAWAR SSC Pacific, PEO C4I, and DISA have moved to implement this framework, and thereby have discovered a number of additional benefits and encountered previously unknown obstacles. As the DoD has moved to emphasize the importance of efficiency and cost savings, the savings presented by this agile C2 solution have grown even more important as the current methods of distributing software components to the tactical edge are time consuming and costly. The ability to distribute applications packages to the tactical edge is technically feasible; the entrenched processes and methodologies in DoD acquisition have been a roadblock to this effort. This paper examines the technical and non-technical acquisition lessons learned through the effort to implement the DoD application store on an Ozone Widget Framework.

15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**16**	

Panel 10. Issues in Distributing Software Components to the Tactical Edge

Wednesday, May 14, 2014	

3:30 p.m. – 5:00 p.m.	**Chair: Reuben Pitts,** President, Lyceum Consulting, LLC
	
	Discussant: Michael Schwind, Vice President Maritime Sector, Siemens PLM Software
	
	Smartphones in the Tactical Environment: A Framework for Financial Analysis of U.S. Marine Corps Options
	      Nick Dew, Naval Postgraduate School
	      Glenn Cook, Naval Postgraduate School
	      John Gibson, Naval Postgraduate School
	
	"Pushing a Big Rock Up a Steep Hill": Acquisition Lessons Learned From DoD Applications Storefront
	      Amanda George, SPAWAR Systems Center Pacific
	      Michael Morris, SPAWAR Systems Center Pacific
	      Matthew O'Neil, SPAWAR Systems Center Pacific

"Pushing a Big Rock Up a Steep Hill": Acquisition Lessons Learned From DoD Applications Storefront

Amanda George—SPAWAR Systems Center Pacific [amanda.george@navy.mil]

Michael Morris—has over 30 years of experience in C4I systems, including most recently working as lead systems engineer (LSE) for DoD/PEO C4I Marketplace efforts. He previously served as deputy project manager/LSE for the Collaborative Force Analysis Sustainment and Transportation at SSCPAC. Morris has also worked in the Test and Evaluation of Net Enabled Command and Control, gaining extensive knowledge in Service Oriented Architectures. Additionally, he has extensive experience in Global Command and Control System-Maritime/Joint test plan development/procedures, and reports. As COMSPAWARSYSCOM 04F Afloat Test Director (2000–2004), he was responsible for testing all SPAWAR products installed on U.S. naval vessels. [michael.a.morris@navy.mil]

Matthew O'Neil—SPAWAR Systems Center Pacific [matthew.c.oneil@navy.mil]

Abstract

The DoD and the military services are currently working to provide widget and app storefronts to disseminate applications that enable agile, composable, C2 capabilities. Leveraging the government-developed open source Ozone Widget Framework, web applications can be registered in a single repository, and discovered and composed by the warfighter. Through both process and technical means, the DoD Applications Store works to streamline the software acquisitions process. The DoD Applications Store as an Ozone Marketplace will include automated delivery of software patches, web applications, widgets, and mobile application packages. The envisioned application store will deliver software from a central repository, over the land or air, to the warfighter at the tactical edge, thereby increasing C2 agility.

Through the last several years SPAWAR SSC Pacific, PEO C4I, and DISA have moved to implement this framework, and thereby have discovered a number of additional benefits and encountered previously unknown obstacles. As the DoD has moved to emphasize the importance of efficiency and cost savings, the savings presented by this agile C2 solution have grown even more important as the current methods of distributing software components to the tactical edge are time consuming and costly. The ability to distribute applications packages to the tactical edge is technically feasible; the entrenched processes and methodologies in DoD acquisition have been a roadblock to this effort. This paper examines the technical and non-technical acquisition lessons learned through the effort to implement the DoD application store on an Ozone Widget Framework.

Introduction

As the United States military services and the overarching U.S. Department of Defense (DoD) moves to encourage and enable agile C2, a major hurdle still stand in the way: an acquisition system geared towards procuring large items, like air craft carriers, rather than continuously evolving software applications. As many defense experts have observed over the last decade, the DoD acquisition system has been plagued with ongoing problems in the performance of the weapons acquisition programs including cost growth and schedule delay. These difficulties have been particularly apparent in the realm of hardware and software needed to create the command and control (C2) tools to enable agile C2 and lead to decision superiority.

The problems in acquiring the tools necessary to enable agile C2 are particularly important given the premium that the U.S. Services, and the U.S. Navy in particular, has placed upon the need for decision superiority. To enable effective maritime superiority and

maintain global maritime awareness, the U.S. Navy has made information a "main battery" of its arsenal. Information, when networked across joint, allied, and coalition forces enables commanders with the ability to cooperatively create a common operating picture—to better able to see what is over the horizon faster than the adversary. As noted in the U.S. Navy's 2010 *Vision for Information Dominance*,

> [T]he Navy will create a fully integrated C2, information, intelligence, cyberspace, environmental awareness, and networks operations capability and wield it as a weapon and instrument of influence.[1]

Enhancing its proficiency at operating within the information domain will also allow the Navy to better respond to a rapidly changing battlespace as it takes advantage of advanced IT and networks; develop a global enterprise through network centric operations and command and control (C2); and elevate the use of information as a main weapon alongside traditional weapons.

As the world becomes "a global multipolar one with gaps in national power continuing to narrow between developed and developing countries,"[2] the United States is facing increasing economic pressures at home. The recent cuts in the U.S. defense budget, and the strong possibility that more are forthcoming, have precipitated a vigorous strategic analysis within the defense community. The recently released documents *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*[3] and *Defense Budget Priorities and Choices*[4] lay out the United States' military response to fiscal pressures at home and uncertainty abroad. *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*— otherwise known as the Defense Strategic Guidance (DSG)—notes that "the global security environment presents an increasingly complex set of challenges and opportunities to which all elements of U.S. national power must be applied."[5] As such, despite budget pressures,

> For the foreseeable future the United States will continue to take an active approach to countering these threats by monitoring the activities of non-state threats worldwide, working with allies and partners to establish control over ungoverned territories and directly striking the most dangerous groups and individuals when necessary.[6]

The United States will perform this task in part by being selective about committing its forces. The DSG states, "our forces must be capable of deterring and defeating aggression by an opportunistic adversary in one region even when our forces are committed to a large--- scale operation elsewhere."[7] This is a change from the previous "two-war doctrine" in which the United States maintained the capability to fight two full-scale wars simultaneously. The *Defense Budget Priorities and Choices* states, "this strategic precept puts a premium on

---

[1] Department of the Navy (DoN), *Vision for Information Dominance* (Washington, DC: Department of the Navy, 2010).
[2] Office of the Director of National Intelligence, *Global Trends 2025*, vi.
[3] DoD, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Author, 2012).
[4] DoD) *Defense Budget Priorities and Choices* (Washington, DC: Author, 2012).
[5] DoD, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Author, 2012), 1.
[6] DoD, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Author, 2012), 1.
[7] DoD, *Sustaining U.S. Global Leadership*, 1.

self- and rapidly- deployable forces that can project power and perform multiple mission types."[8]

As the U.S. faces the uncertain, rapidly changing security environment described in its strategic documents, "[a]gility is increasingly becoming recognized as the most critical characteristic of a transformed force, with network-centricity being understood as the key to achieving agility." Today, agility is no longer "merely an *attribute* of the C2 system,"[9] instead "military establishments have recognized that ability considerations must *permeate* the mission capability package, operational concept, or force"[10] (emphasis in original).

This paper will focus on the possibility that the use of widgets and applications, hosted on a DoD-wide applications store, using the Ozone Widget Framework, can enable agile C2 by utilizing an agile acquisition and governance process to quickly deploy composable C2 capabilities to the U.S. fleet. The work at the U.S. Navy's Space and Naval Warfare Systems Center Pacific has shown this approach to be technically feasible, but there have been significant challenges in adjusting the acquisition process to facilitate the quick deployment.

Widget & App Stores

One recent innovation, both in the technology and its operational use, is the growing importance of widgets and applications offered to the warfighter through an application storefront. The use of widgets and apps increases the agility of a military unit, be it a commander in a command center or a sailor deployed on a cruiser. Through widgets and specialized apps the warfighter can easily access data to increase situational awareness as well as connect rapidly with a command center. They provide the command center and the warfighter the ability to rapidly adapt their information sources to their information needs. The widgets, each providing tailored information and services, can be composed in a variety of ways for the warfighter to tailor the specific information that is needed, while culling the information that is unnecessary for the task at hand.

Currently, the C2 systems for warfighters are designed to perform a single mission. Each ship or unit is outfitted with the C2 information and tools that are applicable to the mission that it is deployed to do. If there is enough room, then alternate tools may be loaded, but given the information storage constraints in any deployment, be it naval or expeditionary, there is finite space for additional C2 tools not tailored to the current mission. Basically, the current process puts as many capabilities in one bag as can fit and sends the units out to perform within that bag of capabilities requiring different units to have different fixed sets of capabilities and to be constrained to those actions only. Thus the warfighters face the challenge that their C2 abilities are limited by the tools that they deploy with. This limitation constrains the warfighters' ability to quickly change missions without returning to base. Widget and app offered in a storefront combined with an afloat cloud environment will enable a any warfighting unit to change its C2 capabilities to respond to changing mission requirements, without necessitating a return to its base.

---

[8] DoD, *Defense Budget Priorities and Choices* (Washington, DC: Author, 2012), 7.
[9] David S. Alberts and Richard E. Hayes, *Power to the Edge* (Washington, DC: DoD Command and Control Research Program, 2005), 126.
[10] David S. Alberts and Richard E. Hayes, *Power to the Edge* (Washington, DC: DoD Command and Control Research Program, 2005), 127.

The wave of the future is to provide composeable capabilities for all units. Emerging needs, codified in the DoD's strategic documents require the U.S. to continue to provide for a shrinking military and an expanding global need. As the DSG states, *"[w]henever possible, we will develop innovative, low-cost, and small-footprint approaches to achieve our security objectives*, relying on exercises, rotational presence, and advisory capabilities" [11] (emphasis in original). The idea of composeable warfighter is not new, however, it is possible today. The ability to provide Widgets, applications, application bundles, and services on demand to the warfighter to reconfigure the mission capabilities, will allow commanders to change mission parameters of any unit. The unit in turn would be able to turn off and turn on capability packages as required meeting mission requirements. This innovative approach will enable agile C2 even in a DIL environment and as a mission set evolves.

The major enabler of this is the ability to expose and discover these capabilities by the warfighter. Storefronts on enterprise and deployed networks provide the ability to instantiate software and platform as a service is key element to providing the composeable mission capability.

These devices are innovative in that they also provide warfighters with the ability to provide pertinent data to the central command center thereby increasing the total situational awareness. The DoD and the military services are currently working to provide widget and app storefronts to disseminate applications. The storefronts will enable the developers of the widgets and apps to be more responsive to user needs by allowing them to field innovative products tailored to current needs quickly. The DoD has only started to make inroads within this environment with several Programs of Record (POR) embracing widgets and other mobile technologies, hoping to enhance warfighter situational awareness and access to information. Unfortunately, the Defense Acquisition System has not adapted to this new environment, making it difficult to field these technologies rapidly to meet emergent requirements.

Ozone Widget Framework (OWF)

What Is a Widget?

Widgets are lightweight, single-purpose web-enabled applications that users can configure to their specific needs. Widgets can provide summary information or a limited view into a larger application and can be used alongside related widgets to provide an integrated view as required by the user.

OWF

The Ozone Widget Framework (OWF) is a platform that offers infrastructure services to simplify the development of workflows and presentation-tier application integration. It is also a layout manager for the operation of widgets on a single web page. Widgets, which are web applications that can be installed and executed in a web browser, display information or provide dynamic content from a backend or local service. Just like any widget framework, OWF supplies the structure and templates for creating widgets providing users with the capability to develop, share, and operate widgets. Unlike a standard browser

---

[11] DoD, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington, DC: Author, 2012), 3.

window, OWF allows users to load and operate multiple widgets within a single webpage rather than opening multiple browser windows or tabs to display more than one widget. This allows users to view a great amount of information on a single browser interface. From an intelligence analyst's standpoint, the OWF provides a means to conveniently search, access, and display intelligence data on a single display. Furthermore, the OWF allows the user to adapt their information flows, by adding, deleting or modifying the loaded widgets, in miniscule amount of time. In under a minute, an OWF operator can change the information they have access to allowing the user to agilely adjust to any changing circumstance.

OWF allows users to load widgets, select a layout type called a dashboard layout, and customize the arrangement of the widgets within the dashboard. OWF supports multiple dashboard layouts including desktop, tabbed, portal, and accordion. The desktop layout allows users to arrange and drag widgets anywhere within the browser window much like a desktop application on a standard operating system desktop. The tabbed, portal, and accordion layouts fix the widget positions in the browser, but users are able to select which widgets are assigned to the fixed locations creating a customized display. The dashboard layout and arrangement of widgets is saved when a user logs out of the OWF so the next time the account is accessed the entire layout is maintained. Thus, a user could have a dashboard specifically targeted to address multiple scenarios; this moves the operator away from the stovepiped information system.

The OWF, originally developed and sponsored by the National Security Agency (NSA) as a Government Off-The-Shelf (GOTS) solution, is now Government Open-Source Software (GOSS) with a collaborative software development model. The OWF GOSS Program is responsible for the maintenance of OWF and Ozone Marketplace (OMP) software releases. The OWF GOSS board, comprised of members from NSA, ODNI, DoD, CIA, DISA, SPAWAR, NRO, and INSCOM,[12] can distribute development priorities to any government agency or program requesting the source code for either its own use or for updating. These agencies are encouraged to submit software patches and feature enhancements to improve the baseline code and benefit the community of projects utilizing the OWF and OMP. The OWF also provides a suite of application programming interfaces (APIs) that give widget developers the ability to further their web applications using inter-widget communication, user preferences, and internationalization. Each API is written in JavaScript so that widgets can be built in a large variety of web technologies. Therefore, widgets can be written in the JavaScript capable technology of the developer's choice. The ability of each agency to customize their APIs further allows for quick responsiveness.

Widgets in Action

The power of widgets and apps to provide agile C2 is being recognized across the DoD. The recognition of the power of these apps is driving a push to change the acquisition structure of these products to allow them to be fielded in a responsive manner. The Navy's Program Executive Office for Command, Control, Computers, Communications and Intelligence (PEO C4I) located at the Space and Naval Warfare Systems Center (SPAWAR)

---

[12] The OWF GOSS board includes members from the Office of the Director of National Intelligence (ODNI), the Central Intelligence Agency (CIA), the Defense Information Systems Agency (DISA), Space and Naval Warfare Systems Center (SPAWAR), the National Reconnaissance Office (NRO), and United States Army Intelligence and Security Command (INSCOM).

is actively working to implement a storefront and a widget acceptance process through which widgets can be fielded through an already existing program of record and thereby reach the user in a timely fashion. Command and Control and Intelligence widgets as well as the Ozone Market Place (OMP) provide examples of this embrace of widgets. These C2 widgets when fielded provide agile C2 capabilities in response to emergent warfighter requirements.

PEO C4I Storefront Overview

Before new capabilities are made available to the warfighter, they must undergo developmental tests, operational tests, and a strict certification and accreditation (C&A) process. All of which can take as long as nine months, enough time for the "new" technology to become out of date and unresponsive to immediate user needs. One of PEO C4I's FY2012 Strategic Goals is to "[f]oster focused innovation to rapidly field relevant capabilities to meet existing and emerging warfighter needs."[13] Widgets provide a technological capability to foster this rapid fielding ability and provide the potential to rapidly implement C4ISR and operational capabilities to the warfighter. Widgets are being deployed in the Navy operational environment as part of formal software builds and releases for Programs of Record (PoRs). The PEO C4I Storefront and a governance process specific to widgets submitted by an accredited PoR will reduce lead times and ensure that widgets are efficiently and securely introduced in a production environment for the warfighter.

Using the widget framework the operator is not only able to be successful but is able to maintain "success in light of changed or changing circumstances"[14] a key component of agile C2. The PEO C4I Storefront provides an example of how quickly widgets can be created and fielded when they are associated with an already accredited PoR. It behooves the DoD to examine its acquisition paths and to adopt widgets and associated storefronts at an accelerated pace in order to enable agile C2. The DoD must also work to establish the storefronts in order to enable deployed commanders to effectively compose their C2 capabilities even in DIL environments. As Global Trends 2030 notes "the future world order will be shaped by human agency as much as unfolding trends and unanticipated events" (Global Trends 2030, p. 3). Thus it behooves the DoD to enable its commands to be able to respond to these events with innovative approaches as exemplified by the use of widget and application storefronts described in this paper.

The Navy seeks to increase the speed at which new capabilities are provided to the warfighter by creating an efficient test, verification and validation process to govern widgets. Figure 1 depicts the operational concept of the Navy Storefront. A widget developer produces a widget which he submits to the T&I Storefront Environment for testing. The Navy Widget Test and Integration (T&I) Team provides feedback to the widget developer on improvements needed to make the widget compliant with the Operational Storefront standards. Upon completion of all testing, the widget is promoted to the Operational Storefront Environment. From there, the Operational User can discover the widget from a Marketplace (applications store) and consume the capability in an operational environment.
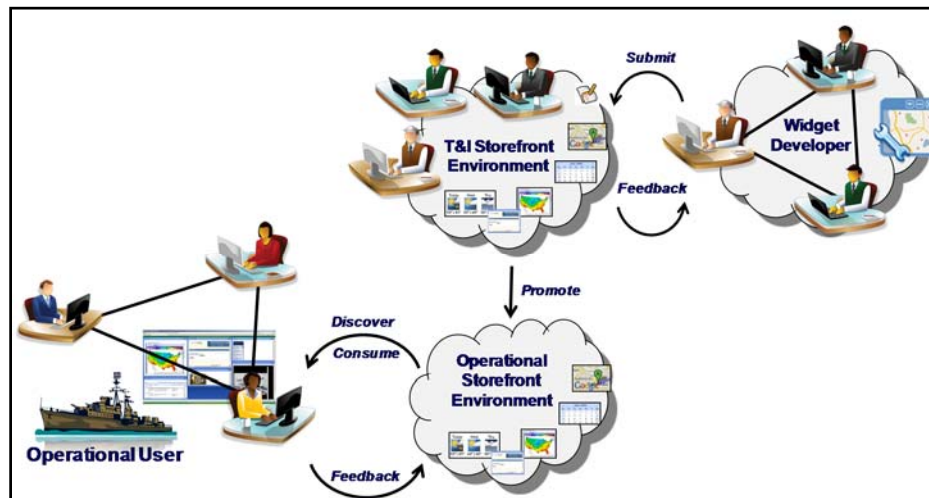
---

[13] PEO C4I Strategic Plan 2012–2017. (San Diego, CA: PEO C4I, 2011), 6. Retrieved from http://www.public.navy.mil/spawar/PEOC4I/Documents/PEO_C4I_StrategicPlan[FY12].pdf
[14] Alberts, The Agility Advantage, 66.

Ultimately, the operational user can provide feedback about the widget to build on the existing capability or to inspire new capabilities.
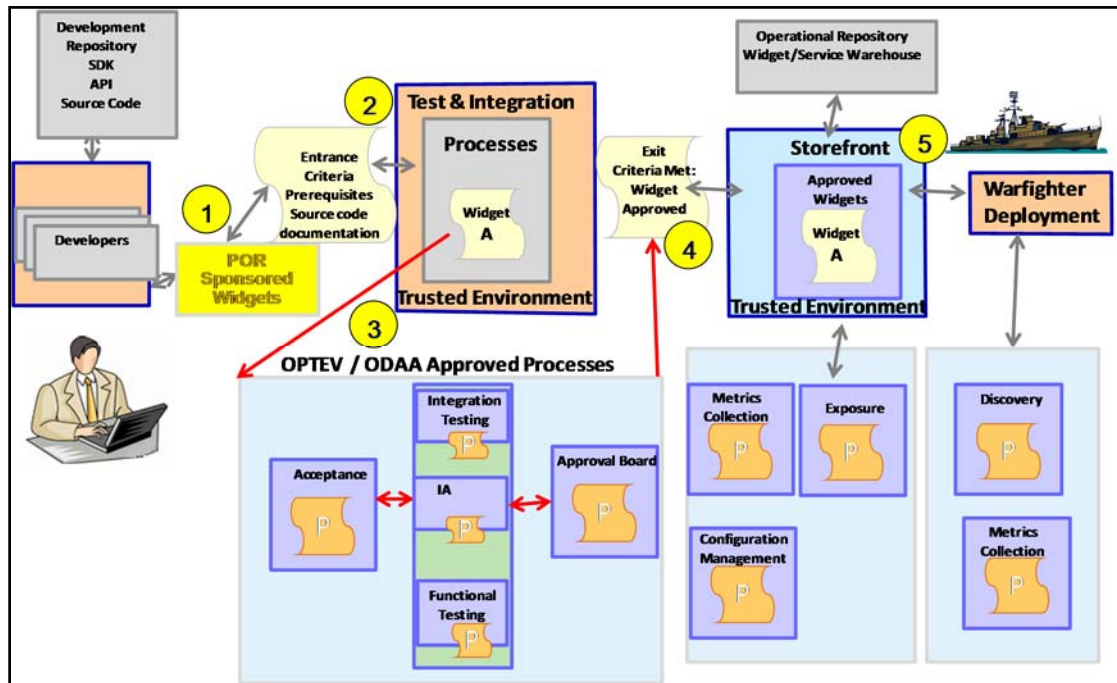

Figure 1. **Navy Storefront Operational Concept**

Widget Governance Tool

Widget governance is how an organization establishes and controls its processes and policies regarding widgets. It includes a system to track and record where a widget is within a widget process and checks for its compliance with existing policies. By establishing an efficient test and evaluation process to govern widgets and approve their acceptance into a marketplace, the lead time for a developmental concept to reach the warfighter can be greatly reduced.

The following, described in Figure 2, is an overview of the widget governance tool that governs widgets beginning with its initial submission to the widget governance process to its acceptance into the operational environment where it is becomes available for use by the warfighter.
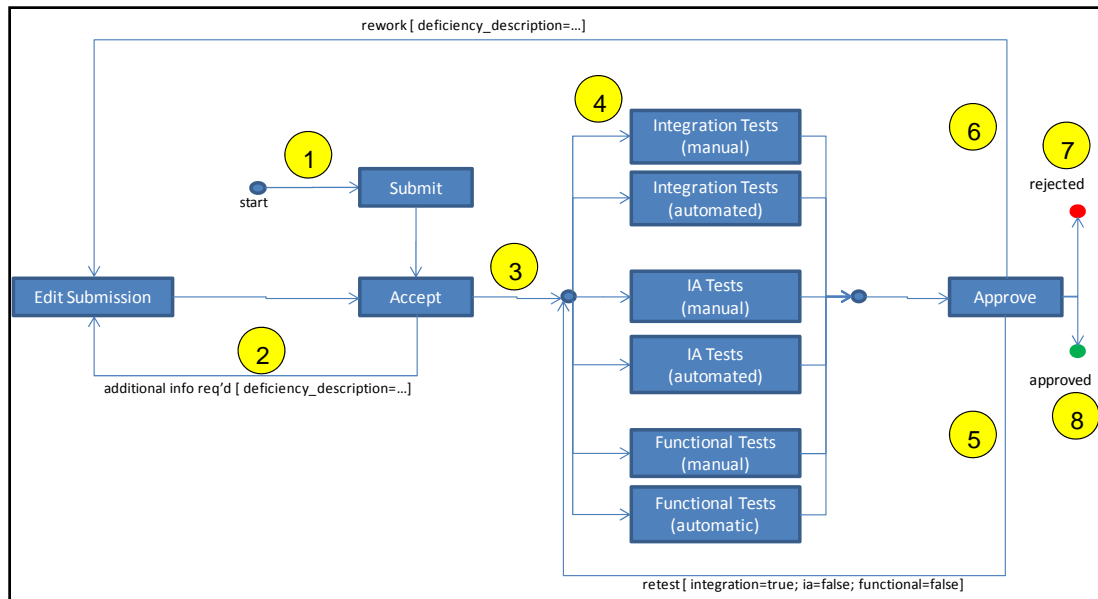
Figure 2.   Widget Governance Process Overview

Developers provide widgets to Programs of Record (PoR) which expose capabilities in a widget framework (1). The widgets must meet Entrance Criteria for introduction to the Test and Integration (T&I) environment (2), which includes the source code, descriptive metadata, configuration documentation, and developer testing results for the target production environment. Applying Navy approved processes, the widget passes through a number of manual and automated tests to ensure suitability for the production Storefront environment (3). Upon review of the test results which verify that the widget meets the exit criteria (4), the widget is approved to be introduced into the Storefront operational environment (5) and is made readily available to the warfighter. The following, detailed in Figure 3, is a detailed process flow for the widget governance tool.

Figure 3.   Detailed Widget Governance Process Flow

A Widget Submission Package (WSP) is submitted (1) which contains source code and documentation of the widget and application programming interface (API), as well as metadata describing the function, user guidance, characteristics, boundaries and deployment locations, preferred browser and system configuration, installation instructions and dependencies. Developer Functional, IA and Integration Test Reports are also included, as well as a Mobile Code risk mitigation strategy and a statement that the widget has been developed in accordance with mobile code developer's guidance and a Security Technical Implementation Guide (STIG) report. All required components of the WSP are indexed for ready reference. If the package does not pass the Acceptance test (1), a report of deficiencies is provided and the submitter is provided the opportunity to edit and correct the submission (2). If the WSP passes the Acceptance subprocess, the package is provided for Functional, IA, and Integration Testing subprocesses in the T&I environment (3).

The Functional, IA, and Integration testing is conducted in parallel to the greatest extent possible in order to optimize testing resources and make the procession of the WSP through the process efficient (4). Functional testing will focus on the proper operation of the widget in generating the desired output in a widget as described by the PoR. Integration testing will concentrate on how well the widget performs in the Storefront environment (e.g., with the widget framework, identity management solution, etc.) and also amidst other widgets. IA testing will ensure that the widget meets OWF standards, that backend services and data inherit configuration attributes from their accredited parent environments, that information is exchanged over a secure channel, and that the widget operates in a manner which ensures an acceptable level of security. Some tests will be conducted manually by the T&I Testing Team, but automation is desired to the greatest extent possible to decrease the amount of time and manual effort required to designate a widget suitable for the operational Storefront environment.

Upon completion of the preceding tests, the results will be aggregated and compiled for the Approval Board subprocess. The Board may determine that a WSP needs to be returned to the T&I Test Team if the results did not demonstrate acceptable functional, information assurance or integration testing results (5). A widget may also be ordered to be reworked by the developers if major deficiencies exist which must be corrected prior to

deployment to the operational Storefront environment (6). Additionally, a WSP may be rejected if the content rendered or output of the widget is deemed to be inappropriate or of no added value in the Storefront environment (7), or approved, making it available to the warfighter in from the production Storefront environment (8).

Challenges

While the widgets process discussed is technical feasible, and superior to the current acquisition system, there remain significant challenges to the implementation of the widgets governance framework. There are a number of different individuals and offices in the DoD that must be "brought on board" for this process to work.

The first crucial step is for the DoD as a whole to understand the importance of acquisition reform, in particular, acquisition reform that is designed to facilitate the rapid acquisition of software applications and widgets. Fortunately, progress is being made in this realm at the Department of Defense level. Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]) Frank Kendall has been working on a series of Better Buying Power initiatives designed to reform the acquisitions process and change the culture of the acquisitions community within the DoD. Most recently, released in November 2013, his Better Buying Power 2.0 strategy focuses on continuing to increase performance while implementing new initiatives. As Kendall states in his memo, "this represents a management philosophy of continuous improvement in our acquisition practices." The strategy is divided into seven focus areas, in each of these areas there are several new initiatives. The following initiatives are particularly important for increasing the acceptance and the future implementation of the agile acquisition process need for the DoD application stores.

In the focus area "Control Costs Throughout the Product Lifecycle" the initiative regarding the cost performance of programs and institutions is particularly applicable to the use of C2 widgets and apps. The initiative states,

> Institute a system to measure the cost performance of programs and institutions and to assess the effectiveness of acquisition policies: The Department will become more data driven in assessing its own and industry's performance at achieving improved productivity. The Department will develop metrics for the programs and institutions (government and nongovernment) within the acquisition system and assess performance to better understand best practices in industry and government.

The process of developing a new widget and sending it through the governance process described in Figure 2 takes measurably less time and manpower than the current system of deploying new capabilities into the systems manually. Thus, if widgets and the applications stores are examined with the metrics to be developed by this initiative, they will be proven to be more cost effective. Additionally, widgets enable an existing program of record to be updated without large costs, thereby reducing the total lifecycle cost of any C2 program of record.

In the focus area "Eliminate Unproductive Processes and Bureaucracy" the initiative focusing on reducing cycle time while ensuring sound investment decisions speaks directly to the problem that the widget governance system can solve. The initiative states,

> Reduce cycle times while ensuring sound investment decisions: This initiative will assess the root causes for long product cycle times, particularly long development cycles, with the goal of significantly reducing the amount of time, and therefore cost, it takes to bring a product from concept to fielding.

The widget governance process will achieve the stated "goal of significantly reducing the amount of time, and therefore cost" while deploying C2 widgets that the end user has had significant input into. This will create a better product, while reducing time and cost.

Finally, in the focus area "Promote Effective Competition" the initiative focusing on open system architectures will encourage the creation of many different widgets, as the underlying system (in this case OWF) has an open architecture. The initiative states,

> Enforce open system architectures and effectively manage technical data rights: This item is continued from BBP 1.0 and will focus on improving the Department's early planning for open architectures and the successful execution of the plan to provide for open architectures and modular systems.

The expansion of the use of open architectures and modular systems in software design will encourage many different widget developers, potentially across the Services, to create, test and validate widgets that can be used across different platforms. As the number of widgets created and used increases, the ability of the end user to create truly composable C2 increases as well.

As the focus areas and initiatives in the DoD's Better Buying Power 2.0 show, there is a lot of room for growth in the acquisitions system, however some progress is being made. Unfortunately, the fact that many of the initiatives in Better Buying Power 2.0, released in 2013, are identical to those from Better Buying Power 1.0, released in 2010, highlights the difficulty in changing the culture in the DoD.

Acquisition Culture Change

While the acquisition culture is moving in the right direction, the progress continues to be incremental and the pace continues to be glacial. Initiatives like the Better Buying Power 2.0 confront a key fact in the DoD that culture change needs to happen across a broad organization composed of a large number of individuals with often competing incentives. For the just widget governance process alone, there are a large number of individuals and organizations which need to "buy in" to the process change. As Figure 2 shows for widget governance the following list of individuals and organizations are the minimum number of participants which need to accept the process:

1. The widget developer: the developer needs to have the incentive to produce a widget
2. The program of record (POR): the POR needs to work with the widget developer to ensure the widget is viable, and also needs to work closely with the PEO C4I Widget Test and Integration team
3. The PEO C4I Widget Test and Integration (T&I) Team: the T&I team must be able to provide feedback to the widget developer on improvements needed to make the widget compliant with the Operational PEO C4I Storefront standards, and do this in a timely fashion
4. The Office of Designating Approval Authority (ODAA): like the T&I team the ODAA must be able to judge the compliance of the widget in a timely fashion
5. Commander, Operational Test and Evaluation (COMOPTEV): the COMOPTEV must be able to approve the widget
6. The Operational Storefront Environment: the operational storefront (in this case the PEO C4I Storefront) must be operational and accessible to the operational user

7. The Operational User: the operational user must be aware that he or she can discover the widget from a Marketplace (applications store) and encouraged to consume the capability in an operational environment

Despite the many hurdles that the widget and storefront still has to face, it has become clear that the DoD can no longer continue down its current acquisition path of providing yesterday's solutions to meet today's immediate needs. The DoD *must* modify its view of acquisition. As technology is constantly evolving and improving, the DoD struggles to keep up with the latest capabilities and hinders itself with lengthy acquisition schedules and rising costs. The current commercial trend of delivering small, lightweight mobile applications to an application store allows industry leaders to provide a consistent stream of new capabilities to its customers. The DoD, however, has struggled to adopt this notion of rapid fielding of capabilities.

The future of warfare is information superiority and speed to capability. Lightweight web applications can supply the warfighter with valuable information and can be developed in a short period time since they are comprised of a generally small amount of code. With shortened development times, immediate user needs can be addressed and satisfied more quickly. This will increase the ability of the warfighter to utilize agile C2 to address rapidly changing scenarios in the field. The reduction in time and cost to field a solution goes directly to the heart of agile C2. Widgets provided by an already accredited PoR do not need to undergo the Certification and Accreditation processes that lengthen acquisition schedules and ultimately consume costs. New widget technologies and smaller testing efforts that make them available within an application store will introduce a paradigm shift in the development and delivery of capabilities to the warfighter. Using the widget framework the operator is not only able to be successful but is able to maintain "success in light of changed or changing circumstances"[15] a key component of agile C2. The PEO C4I Storefront provides an example of how quickly widgets can be created and fielded when they are associated with an already accredited PoR. It behooves the DoD to examine its acquisition paths and to adopt widgets and associated storefronts at an accelerated pace in order to enable agile C2.

References

Alberts, D., & Hayes, R. E. (2005). *Power to the Edge*. Washington, DC: DoD Command and Control Research Program.

DoD. (2012). *Defense Budget Priorities and Choices*. Washington, DC: Author.

DoD. (2012). *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*. Washington, DC: Author.

DoN. (2010). *Vision for Information Dominance.* Washington, DC: Department of the Navy.

Office of the Director of National Intelligence, *Global Trends 2025*, vi.

PEO C4I Strategic Plan 2012–2017. (2011). San Diego, CA: PEO C4I. Retrieved from http://www.public.navy.mil/spawar/PEOC4I/Documents/PEO_C4I_StrategicPlan[FY12].pdf

---

[15]Alberts, *The Agility Advantage*, 66.

ACQUISITION RESEARCH PROGRAM
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL
555 DYER ROAD, INGERSOLL HALL
MONTEREY, CA 93943

www.acquisitionresearch.net